ANNUAL WATER MANAGEMENT PLAN - 1979

ARAPAHO NATIONAL WILDLIFE REFUGE
WALDEN, COLORADO

I. GENERAL

Water management and distribution on the Arapaho National Wildlife Refuge is accomplished through a series of gravity flow ditch systems. Each ditch system has a diversion structure in the Illinois River capable of diverting water from the river into the distribution ditch.

Each ditch has a specific diversion point and a decree for a specific number of cubic feet per second based on a priority (first in time) system. These water rights were purchased as a part of the land by the Fish and Wildlife Service.

In most years there is an abundance of water in the Illinois River during the irrigation season and no conflicts with other water users occur. During these periods of abundant water, all users simply divert as much water as they need when and where they desire. 1977 was the only year that the refuge has placed a formal "call" on the river. The Home #1 decree, which is located at the extreme lower end of the refuge, is the most senior right that the refuge owns and can be used during periods of low flow to stop virtually all upstream users from diverting water thus keeping the river "alive".

II. PURPOSE AND METHODS

Nearly 8,000 acres of meadow are flood irrigated each year to stimulate and perpetuate quality waterfowl nesting habitat. Prior to refuge ownership these lands were irrigated and hayed by the private landowners. Haying is immediately terminated as a land use when the property comes under refuge administration. Residual vegetation from the previous years growth must be relied upon for nesting cover as the late spring at this altitude affords no new growth at the onset of nesting. As the nesting season progresses, new growth combines with the residual vegetation affording additional nesting habitat.

The numerous small impoundments located throughout the refuge are filled, maintained and freshened each year with water diverted from the Illinois River via the various ditch systems. Most of the impoundments can be filled by two different methods. Water can be either sent directly to the pond in a ditch or the pond can be filled slowly by picking up excess irrigation water that has flowed over a section of meadow.

It is imperative that the impoundments, old river oxbows, level contour dikes, etc all have open water as soon as possible in the spring to attract and hold migrating ducks. Open water can be realized earlier by diverting river water into the ponds than by simply allowing the ice to melt. For this reason most ponds are drained in the fall to

approximately half capacity if they are not already to that level due to evaporation. River water is then diverted directly to the ponds in the spring as soon as the ditches are free enough of snow to allow water passage.

Throughout the nesting and brood rearing season impoundments are maintained at near maximum levels, if water is available, to stimulate and support emergent vegetation around the perimeter of the ponds which serves as cover for growing ducklings and moulting adults.

Approximately one-third of all refuge ponds are completely drained early each fall to aerate and dry the bottom substrate which will result in increased invertebrate populations the following year.

Due to lack of personnel and the complexity of the irrigation system, some meadows in the past have received too much water over too long a time frame while other areas have not received adequate water. Efforts will be made duting 1980 to intensify meadow irrigation water management to completely cover specific land tracts at timed intervals in an attempt to stimulate more diverse vegetative habitat types.

III. USAGE

Water usage is determined primarily by periodically reading and recording flow through Parshall flumes located just downstream from the various diversion structures of each ditch system. In instances where measuring devices have not yet been installed or where regular monitoring was not possible, estimates were made relative to known use in other systems.

The table below reflects amounts of water diverted into the various ditch systems serving Arapaho National Wildlife Refuge in 1979.

Ditch Name	Acre Feet of Water Diverted
Oklahoma #1	2,706
Oklahoma #2	2,000
Hubbard #1	1.200
Hubbard #2	6,162
Ward #1	2,696
Ward #3	1,000
Boyce Bros.	1,926
Hill & Crouter	1,500
Home #1	1,317
Dryer	800
Midland Extension	1,000
TOTAL	22,307

Actual water use is difficult to plan in advance because it is influenced by the amount of water available for use in the Illinois River. Since 1979 was an excellent water year and refuge needs were well met, we will plan to divert 22,500 acre feet in 1980.

In years when the water supply is short the following [illegible] in effect for use of the available water.

1. Fill as many refuge ponds as possible to capacity and maintain to provide territorial water for nesting pairs and [illegible] and moulters.

2. Irrigate refuge meadows adjacent to permanent water bodies.

3. Irrigate refuge meadows further removed from permanent water [illegible] as available water permits.

IV. COMMENTS AND PROBLEMS

A Parshall measuring flume is needed in the Hill & Crouter system to measure water usage. This chore will be accomplished as soon as weather permits.

There is a free-flowing spring at the old State Fish Hatchery that maintains two ponds and eventually flows into the lower end of the Hubbard Ditch. A 12" or 18" Parshall flume should be installed to monitor the flow of this water source.